
How a stem cell forms a neuron

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CIRM grantees at Sanford-Burnham have published another paper using an embryonic stem cell model to understand one of the earliest steps in human nervous system development. (We've blogged about their work before here.)

The group led by Alexey Terskikh has been trying to understand how a group of cells called the neural crest form nerves, skin, bone and muscle. This process has been somewhat mysterious because it happens at such an early stage in development. Scientists can't exactly peer into a woman's womb to see the process unfold.

That's where embryonic stem cells come in. These cells can form all cell types in the body, including neural crest. On their blog, Sanford-Burnham quotes first author on the May 5 Cell Stem Cell study Flavio Cimadamore:

“Neural crest cells are notoriously difficult to study in humans because of their very early and transient nature â a woman is usually not even yet aware of her pregnancy when they start to migrate and differentiate. So here we took advantage of an embryonic stem cell-based model of human neural crest previously developed in our lab to get a better understanding of the molecular pathways that control the differentiation potential of such cells in humans.”

In the current work, the team found that neural crest cells with a gene called SOX2 turned on can go on to form neurons. Those without it can't. That's critical information for people who are trying to understand diseases that arise from neural crest cells that go awry during development. Microphthalmia and CHARGE syndrome are two rare but debilitating childhood diseases that could benefit from knowing more about how the neural crest normally develops.

In the blog entry, Terskikh said:

“We hope this finding will be useful to researchers studying neural crest development and stem cell differentiation.”

CIRM funding: Alexey Turskikh (RS1-004661); Flavio Cimadamore (TG2-01162)

Cell Stem Cell, May 5

A.A.

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